Using Enterprise Architecture To Improve Healthcare Delivery and Build Better Information Systems

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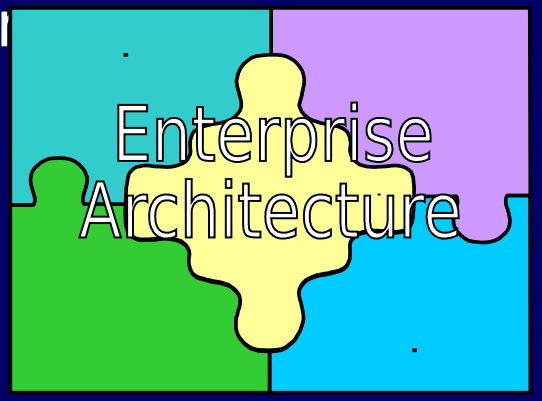
Enterprise Architecture

- This is not an IM/IT Talk
- This is about documenting how we do our business of delivering healthcare
- You should think this is important (OMB does and your funding will be determined by whether you have an architecture and your requirements align with it)
- By the way, it also helps you build better, faster and less costly IM/IT systems

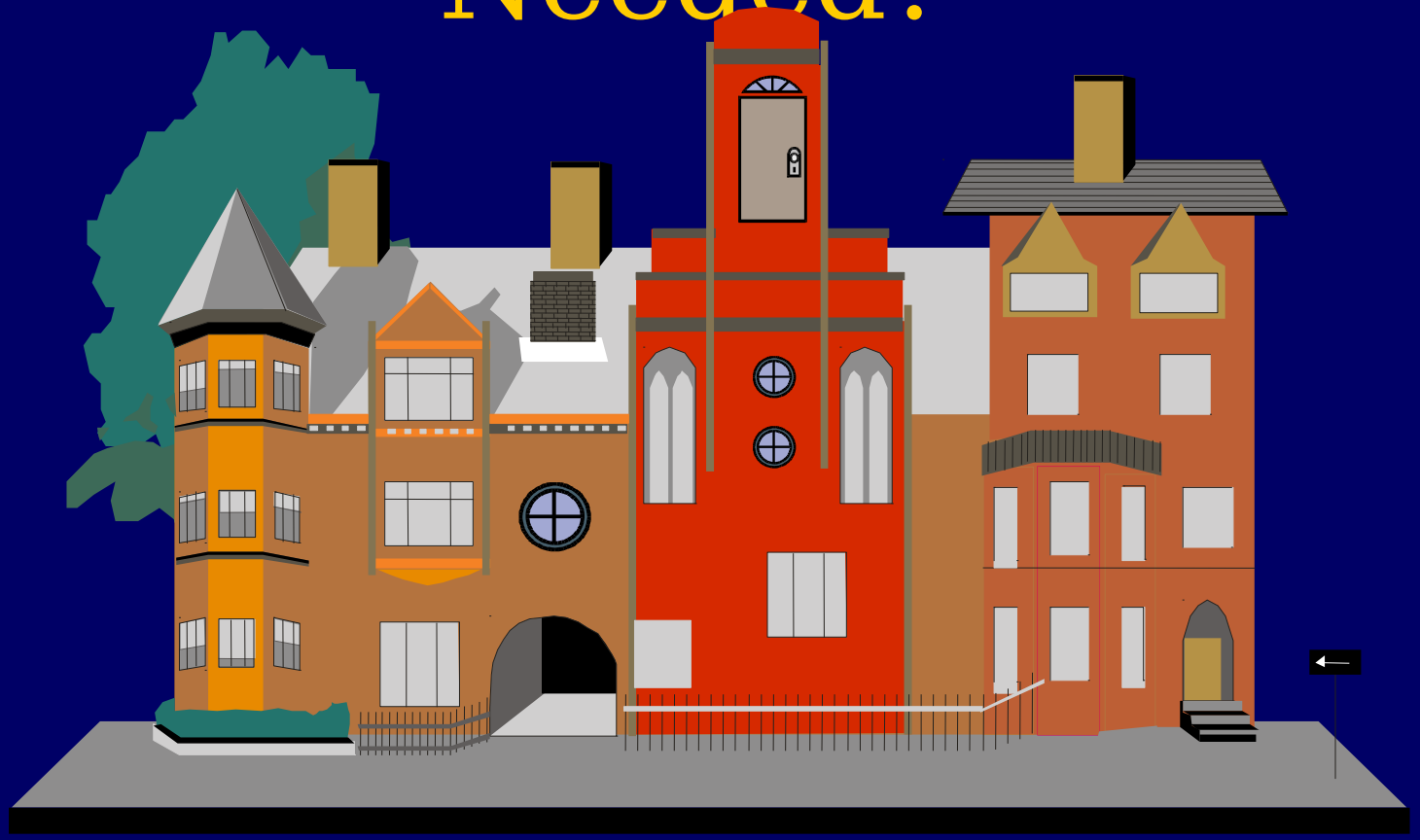
Enterprise Architecture

Enterprise Architecture Defined

An Enterprise Architecture is a strategic information base which defines the mission, the information necessary to perform the mission, the technologies necessary to perform the mission, and the transitional processes for implementing new technologies in response to the changing needs of the mission



Why Is an Architecture Needed?



Too Much Information!

"A weekday edition of the *New York Times* contains more information than the average person was likely to come across in a lifetime in seventeenth century England."

….R.S. Wurman

How Many of You Could Answer the Following Questions?

- What are the roles and training requirements of various members of a PCM team?
- What is the end to end business process for enrolling a patient and what information systems support it?
- What are the key processes in the Manage the Business portion of the Optimization Plan and what IM/IT systems support these functions?
- If I change a data element in CHCS or DOES, will it affect any other business processes or IM/IT systems?

Benefits of an Enterprise Architecture

- Documents your organizational goals and business processes and aligns resources with them
- Aligns IT systems with organizational goals.
- Crucial to interoperability of systems.
- Avoids duplication of functions in different systems.
- Allows for development of Common Services.

Building an Enterprise Architecture...

DoD & OMB require an Enterprise Architecture

"The agency's capital planning and investment control process must build from the agency's current Enterprise Architecture (EA) and its transition from current architecture to target architecture."

OMB Circular A-130, Nov 2000

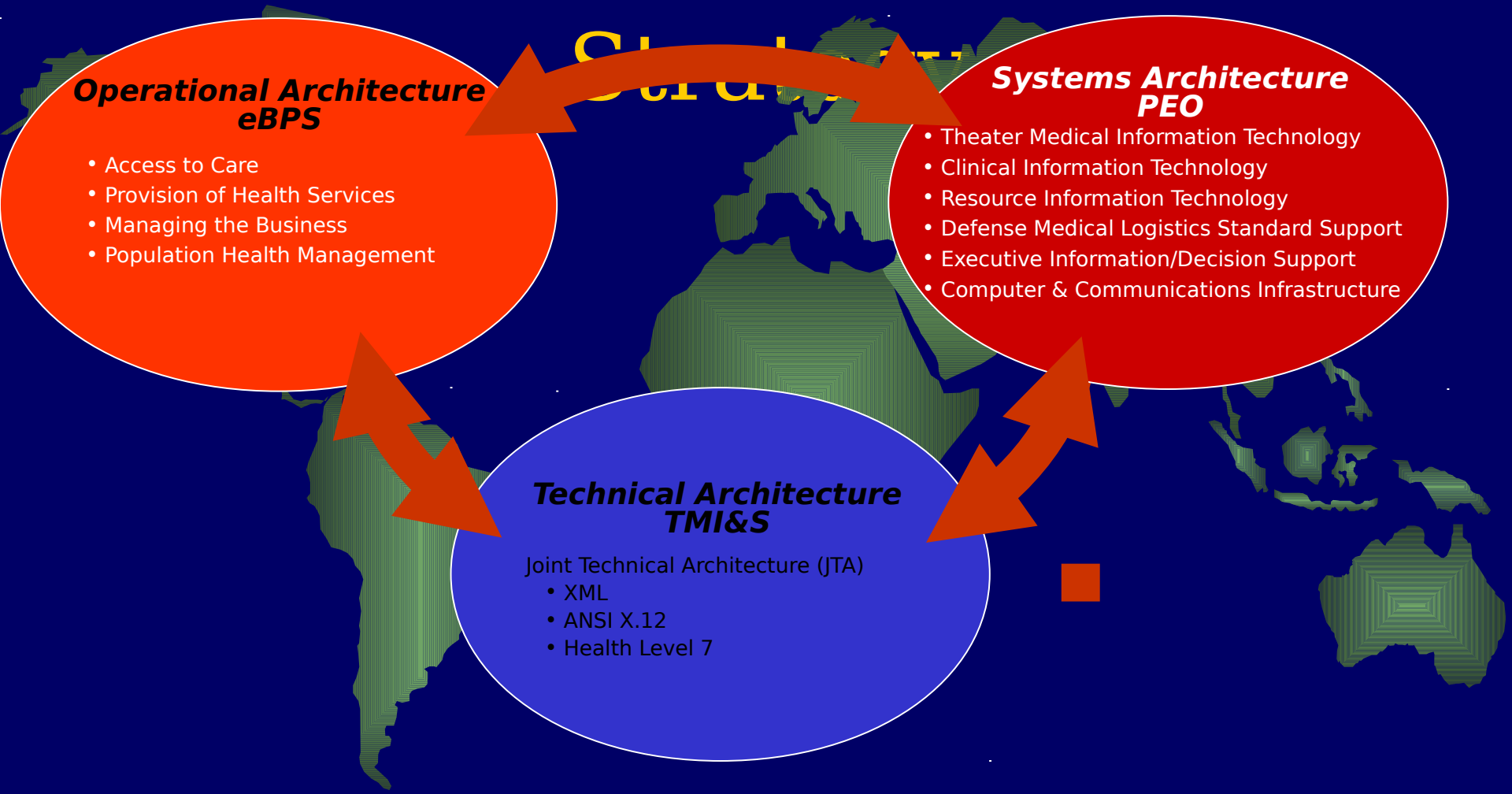
Architecture Drivers

- MHS Business Plan
- Force Health Protection
- Optimization
- Operational Forces Integration
- Clinger-Cohen & HIPAA
- TNEX - TRICARE Next Generation Contracts
- eGov Initiatives
- Need to maximize resources
- Security (Information Assurance)
- DoD network-centric transformation (GIG, GCSS)

IM/IT Challenges

- Building the right functionality
- Avoiding duplicative efforts
- Achieving speed to market
- Getting high-quality at minimal-cost
- Adding new capabilities while maintaining installed base
- Leveraging other initiatives

MHS Enterprise Architecture Strategy

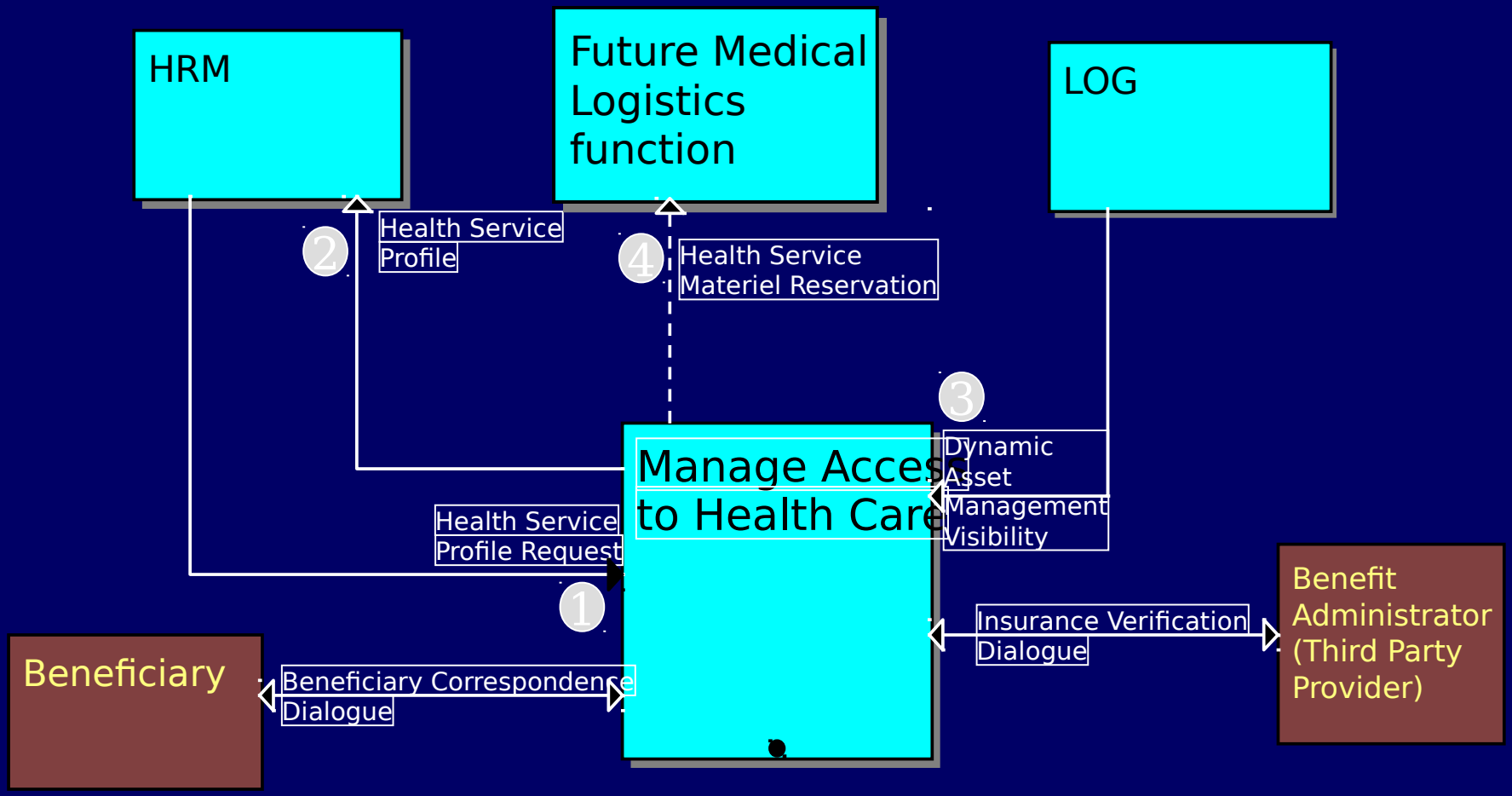


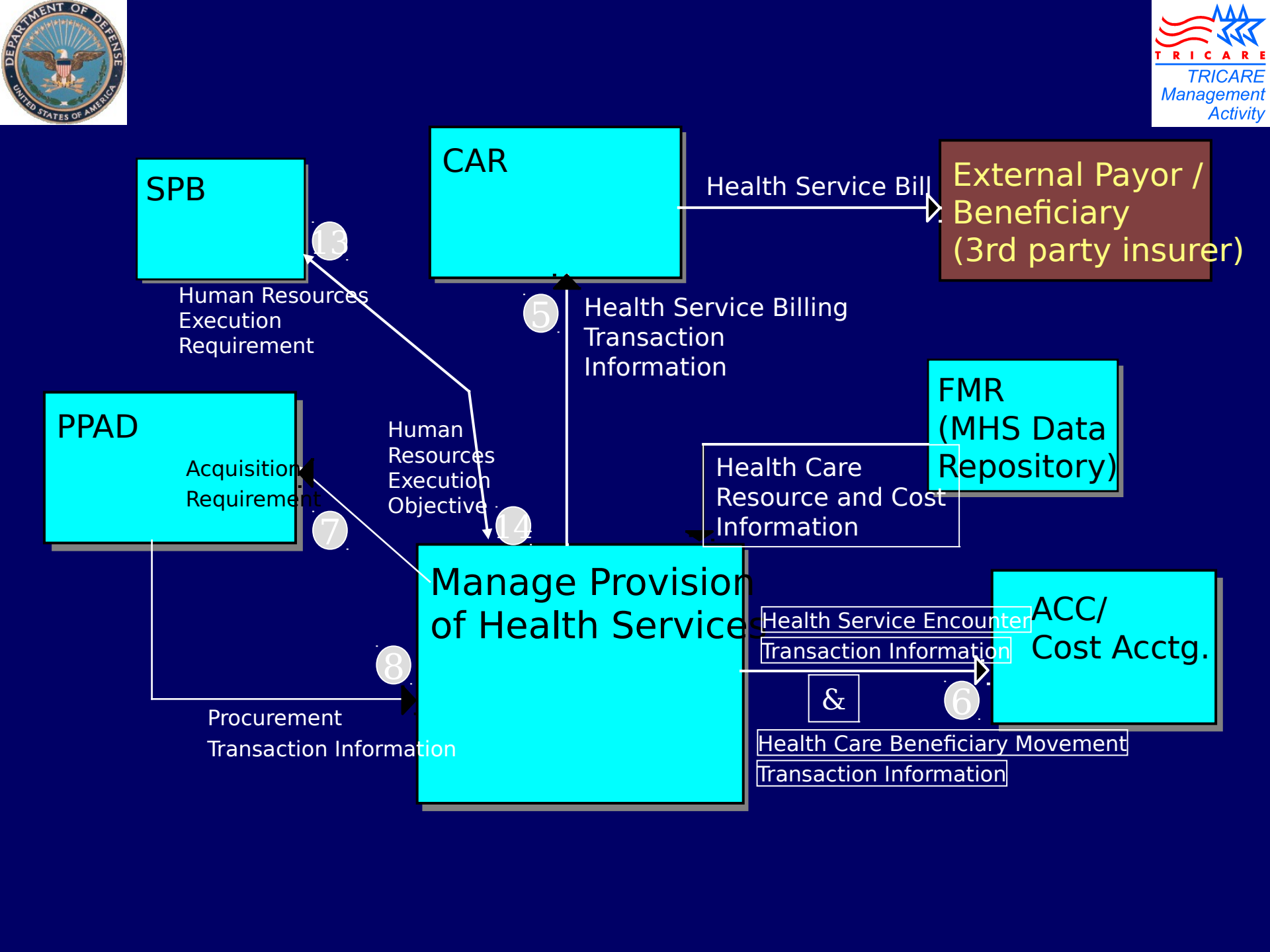
MHS Enterprise Architecture Demo

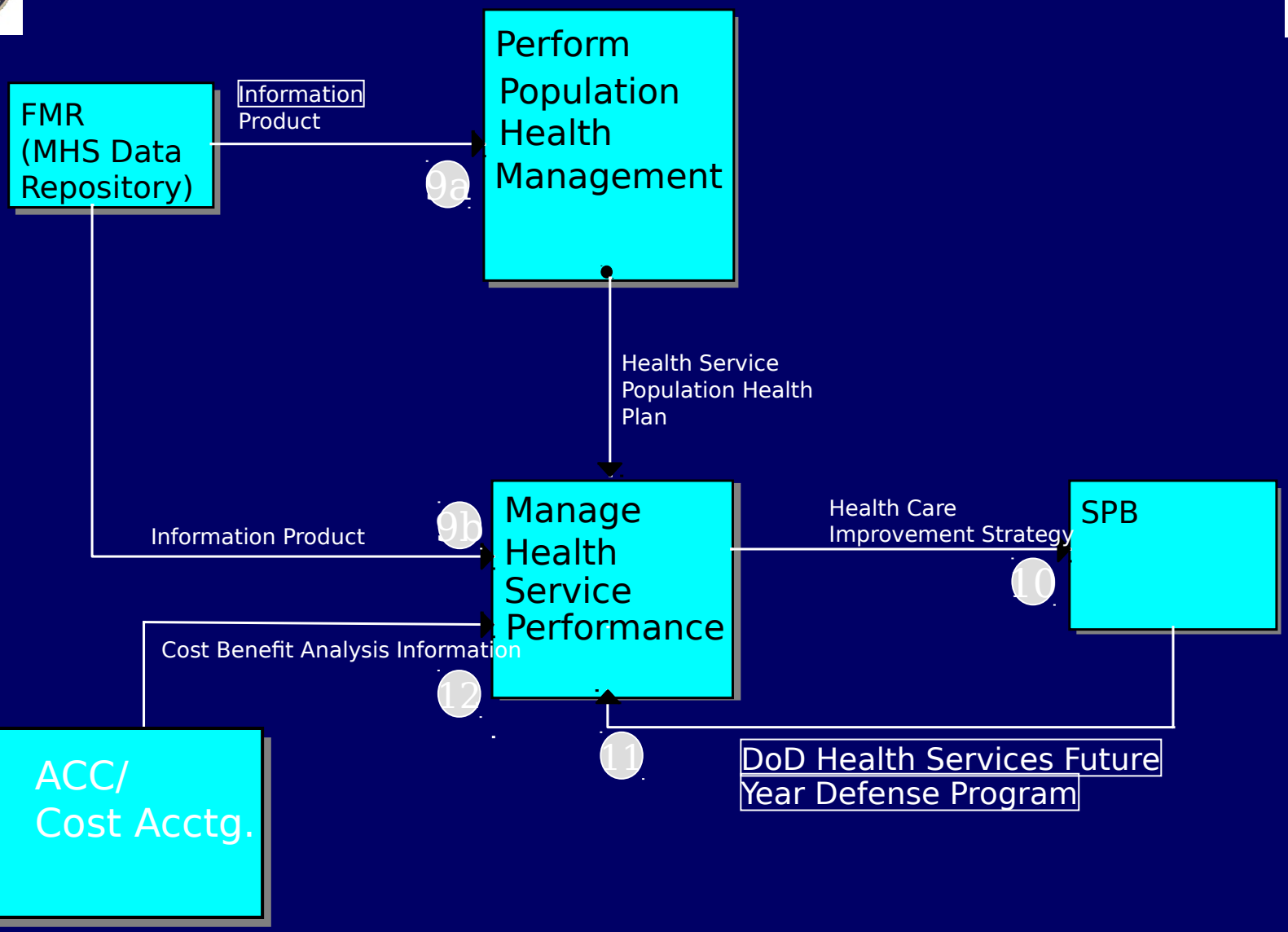
http://www.tricare.osd.mil/architectu

MHS Architecture and DOD's Financial Management Modernization Program (FMMP)

- FMMP is really DOD's EA for the sustaining base
- MHS has been working closely with DOD to map our EA to the evolving DOD Enterprise Architecture


HRM
Future Medical Logistics function
LOG
2
Health Service Profile
4
Health Service Materiel Reservation
3
Dynamic Asset Management Visibility
Manage Access to Health Care
Health Service Profile Request
1
Beneficiary
Beneficiary Correspondence Dialogue
Insurance Verification Dialogue
Benefit Administrator (Third Party Provider)


SPB
CAR
External Payor / Beneficiary (3rd party insurer)
Health Service Bill
13
Human Resources Execution Requirement
5
Health Service Billing Transaction Information
PPAD
FMR (MHS Data Repository)
Human Resources Execution Objective
Acquisition Requirement
7
14
Health Care Resource and Cost Information
Manage Provision of Health Services
Health Service Encounter Transaction Information
ACC/ Cost Acctg.
8
&
6
Procurement Transaction Information
Health Care Beneficiary Movement Transaction Information


FMR
(MHS Data
Repository)
Information
Product
9a
Perform
Population
Health
Management
Health Service
Population Health
Plan
Information Product
9b
Manage
Health
Service
Performance
Health Care
Improvement Strategy
10
SPB
Cost Benefit Analysis Information
12
11
ACC/
Cost Acctg.
DoD Health Services Future
Year Defense Program

Virtual Optimized Clinic - Microsoft Internet Explorer provided by HA/TMA

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Address http://www.tricare.osd.mil/mhsophsc/VOC/default.htm

Virtual Optimized Clinic

Dedicated to disease and injury prevention and Population Health Improvement

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Address http://www.tricare.osd.mil/mhsophsc/VOC/welcome.htm Go

Virtual Optimized Clinic

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PHI Clinic Fundamentals: Welcome to the Clinic *(continued)*

- How to Use this Site
- PHI Clinic Fundamentals
  - Welcome to the Clinic
  - Roles & Responsibilities
    - Role Names
    - PCM
    - Nurse
    - Medical Support Staff
    - Clerk In (Admin)
    - Clerk Out (Admin)
    - Primary Care Team
    - Resource Manager (Admin)

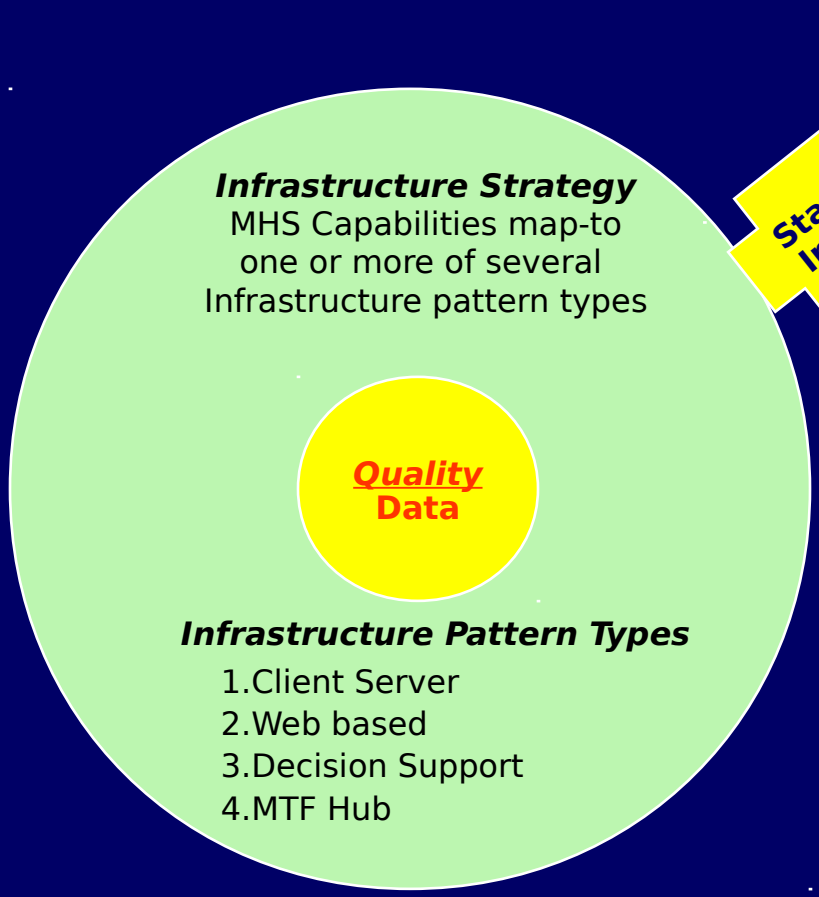
Welcome to the Virtual Optimized Clinic. We represent a revolution in healthcare!

The entire DoD Military Health System (MHS) has changed to preventionist health delivery: *all three branches* of the military are working together to focus, promote, and enact this **change to Population Health Improvement (PHI)** and to create ***one integrated health system*** for our fighting forces and their families.

previous • 1 • 2 • 3 • 4 • 5 • 6 • next

Done Internet

MHS Common Operating Environment Concept



Standard Interface

Application Suites

- Services
- Central Program
- MTF
- MCSC
- VA
- Other

Infrastructure Patterns (Platform Profiles) include:

Component Type

- Processor
- Storage
- Network
- Operating System
- Database System
- Service Component
- Tool

Common Service

A software component providing function(s) used by other software components

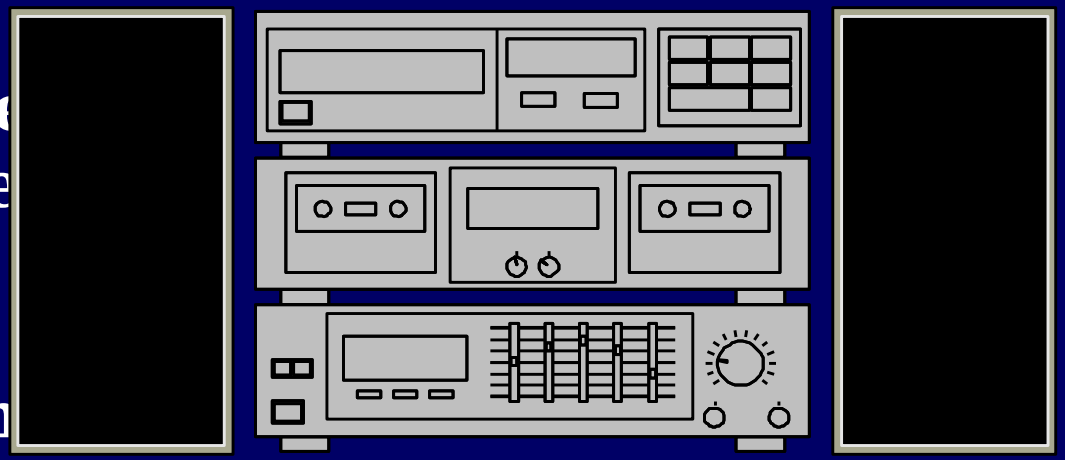
Consider a home stereo system as an analogy:

In most cases, stereo system components:

- **Turntable**
- **CD player**
- **Cassette recorde**

use Common Service

- **Amplification**
- **Volume control**
- **Tone quality con**



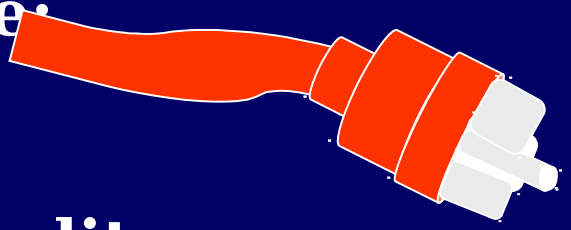
provided by one amplifier component

An Architecture is Needed to Enable Common Services

A standard interface definition

Consider the standard electric jack/plug

- **It's an interface standard (physical form + electrical specifications).**
- **Without it, we would not enjoy stereo components that are:**
  - **— Low cost**
  - **— Interoperable**
  - **— High "data" quality**



The same holds for software components. First, m

- **Identify common services needed, then**
- **Develop interface standards to them**

MHS Computing and Communications Infrastructure Patterns -- Findings

- Web Services Pattern
- Client Server Pattern
- Decision Support Pattern
- Medical Treatment Facility (MTF) Hub Pattern

Web Enabled Components And Characteristics

	Server Hardware Components	Server O/S	Database Component	Messaging Component** (Data Standards)
	RISC based Multi Processor SMP Servers 2 - 512 GB Memory Mainframe Business Case	DII COE Compliant* NSTISSP 11 DITSCAP	ANSI/ISO/IEC 9075-1/2/3/4/5(e) ODMG 3.0(e) Relational DB needs to be Common Criteria Certified	HL7 (e) X12 (e) XML v1.0(m), SAML (df, SSO) SOAP (df, MOM) WSDL (df) CCOW
Examples On Installation	SUN (Current)	Win2K, Solaris	Oracle 9i	Oracle Advanced Queuing (MOM) (Processing power, Fast data)
Off Installation	Storage Area Network (SAN) for Mass storage IBM HP	AIX, HP-UX & OS 390		IBM MQSeries (MOM) SeeBeyond e*Gate

*DII required by ORD **Not an inclusive list

Common Operating Environment

Applications can be displayed through TRICARE Online, leveraging Web Computer & Communications Infrastructure

Understanding the Strategic Value of TOL and Standards-Based Architecture

TRICARE Online - Secure Portal to MHS Resources and Services

Managed Care Support Contractors
- Registration
- Network Providers
- Referrals/Consults
- Claims

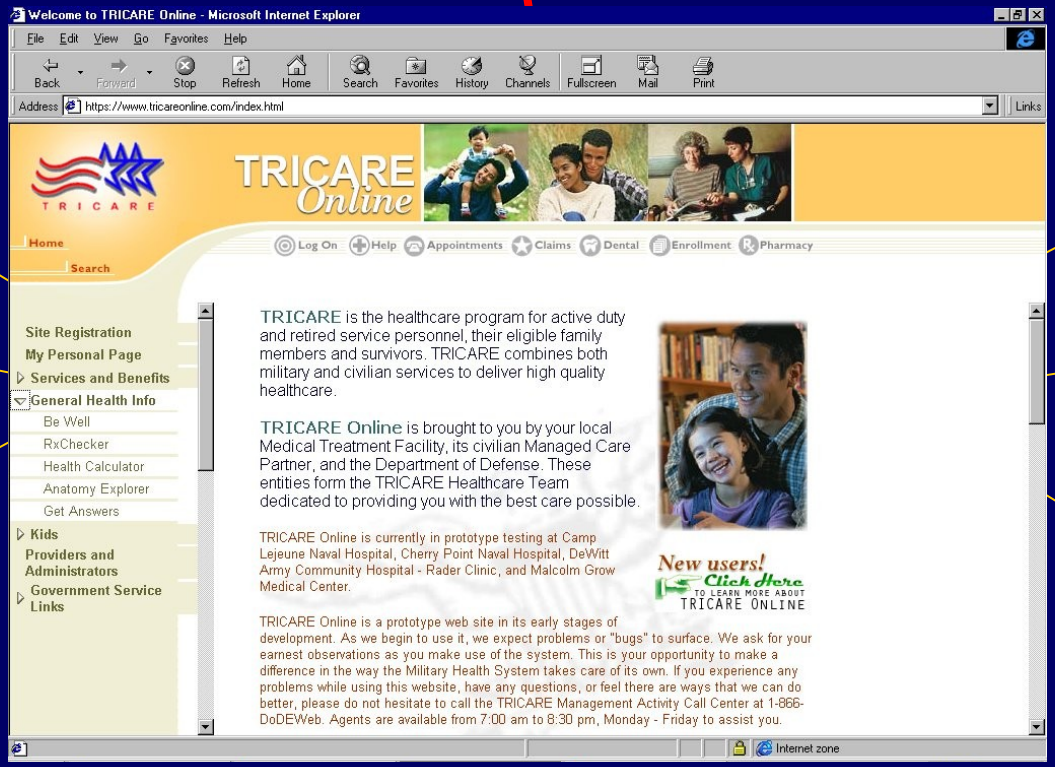
HealthGate Content Repository
- Health Information
- Drug Information
- Drug-Drug Interaction Checker

Composite Health Care System
- Appointments
- Pharmacy
- Lab Data
- Radiology Data
- E-mail

Defense Enrollment Eligibility Reporting System
- Enrollment
- Master Patient Index
- Other Health

Personal Health Journal
- Accessible Health Journal
- Health Risk Assessment

Internet & Defense Information Systems Network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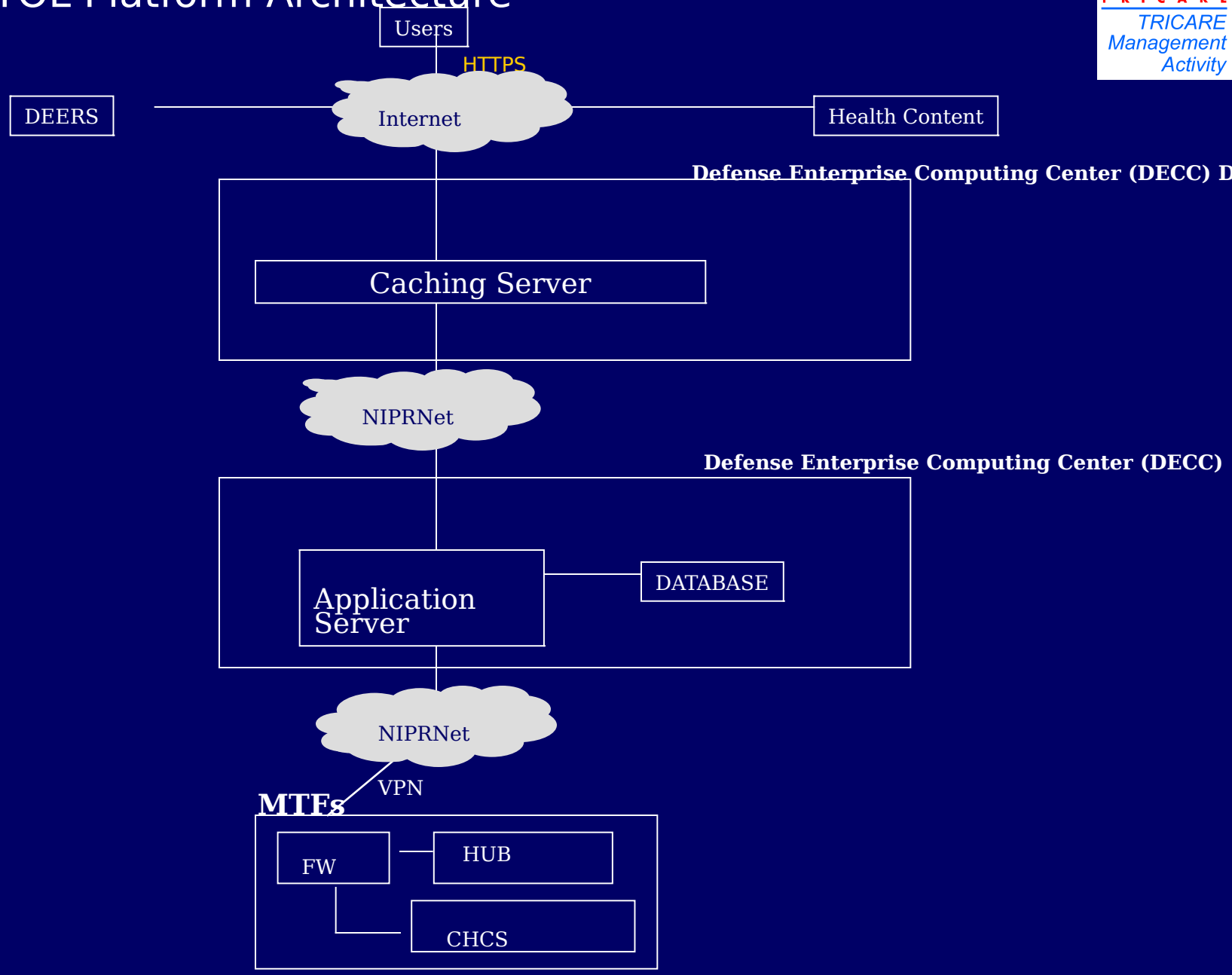
Address https://www.tricareonline.com/index.html
Links
TRICARE Online
Home
Search
Log On Help Appointments Claims Dental Enrollment Pharmacy
Site Registration
My Personal Page
Services and Benefits
General Health Info
Be Well
RxChecker
Health Calculator
Anatomy Explorer
Get Answers
Kids
Providers and Administrators
Government Service Links
TRICARE is the healthcare program for active duty and retired service personnel, their eligible family members and survivors. TRICARE combines both military and civilian services to deliver high quality healthcare.
TRICARE Online is brought to you by your local Medical Treatment Facility, its civilian Managed Care Partner, and the Department of Defense. These entities form the TRICARE Healthcare Team dedicated to providing you with the best care possible.
TRICARE Online is currently in prototype testing at Camp Lejeune Naval Hospital, Cherry Point Naval Hospital, DeWitt Army Community Hospital - Rader Clinic, and Malcolm Grow Medical Center.
New users! Click Here TO LEARN MORE ABOUT TRICARE ONLINE
TRICARE Online is a prototype web site in its early stages of development. As we begin to use it, we expect problems or "bugs" to surface. We ask for your earnest observations as you make use of the system. This is your opportunity to make a difference in the way the Military Health System takes care of its own. If you experience any problems while using this website, have any questions, or feel there are ways that we can do better, please do not hesitate to call the TRICARE Management Activity Call Center at 1-866-DoDEWeb. Agents are available from 7:00 am to 8:30 pm, Monday - Friday to assist you.
Internet zone

TOL – Securely Connecting the MHS

TRICARE Management Activity

TOL Platform Architecture



The Two Components of TOL

- TOL Defense Enterprise Computing Center (DECC)
  - Open Standards (J2EE) portal
  - Any application wrote to J2EE specifications described in the TOL Application Integration Guide can be easily integrated on TOL with no additional hardware and no new DITSCAP requirement
  - Applications can be displayed based on Roles (Segmentation possible by Service, specialty, etc.)
- The MTF Hub Piece
  - Allows secure communication with TOL DISA
  - TOL deals with all the Service Firewall and Security Accreditation Issues
  - Allows local caching and improved performance of web-based applications

Common Operating Environment Benefits

MHS Wide ePortal

- Common Security services
- User authentication handled through multiple venues
- MHS wide standards
- World-wide web based training module
- Enterprise licenses

MTF Hub Server Consolidation

- MHS wide applications hosted at common sites
- MHS wide repositories (systems-of-record)
- MTF caches of information for high performance and availability

Summary

- Enterprise Architecture is everyone's business
- OMB/Congress mandates it use
- EA is a repository for the future business models we are striving to implement
- EA can help you do your job!
- EA can help TMA and the Services build better information systems

Back Up Slides

MHS Enterprise Architecture - Microsoft Internet Explorer provided by HA/TMA

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usable for its intended purpose and that it is consistent with current MHS, TMA, OASD(HA), DoD and Federal policy and guidance.

Applicable Architecture View	Product Reference	Architecture Product	Essential or Supporting	Validation Status
All Views (Context)	AV-1	MHS Global View	Essential	Validated
All Views (Context)	AV-1a	MHS Enterprise View	Essential	Validated
All Views (Context)	AV2	Integrated Dictionary	Essential	Not Applicable*
Operational	OV-1	MHS Operational View	Essential	Validated
Operational	OV-1a	MHS Integrated Health Care View	Essential	Validated
Operational	OV-2	Operational Node Connectivity Description	Essential	92.8% Validated ** (All but Component 4.2 in Manage the Business)
Operational	OV-3	Operational Information Exchange Matrix	Essential	92.8% Validated** (All but 81 IERs for Component 4.2 in Manage the Business)
Operational	OV-CRUD	Activities by Entities Create, Read, Update and Delete Matrix	Supporting	Not Applicable *
Operational	OV-5	MHS Activity Model (Functional Activity Decomposition)	Supporting	Validated
Operational	OV-7	MHS Logical Data Model (information available by request)	Supporting	Version 10.0 was Validated and then Published June 1998 and Version 10.23 Validated and then Published June 2000.
Systems	SV-1	System Interface Description	Essential	Not Validated
Systems	SV-3	Systems^2 Matrix	Supporting	Validated
Systems	SV-8	System Evolution Description	Supporting	Validated
Systems	SV-9	System Technology Forecast	Supporting	Validated
Technical	Enterprise Level TV-1 and Detailed TV-1	Technical Architecture Profile	Essential	Validated

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MHS Activity Model OV-5 - Core Processes - Microsoft Internet Explorer provided by HA/TMA

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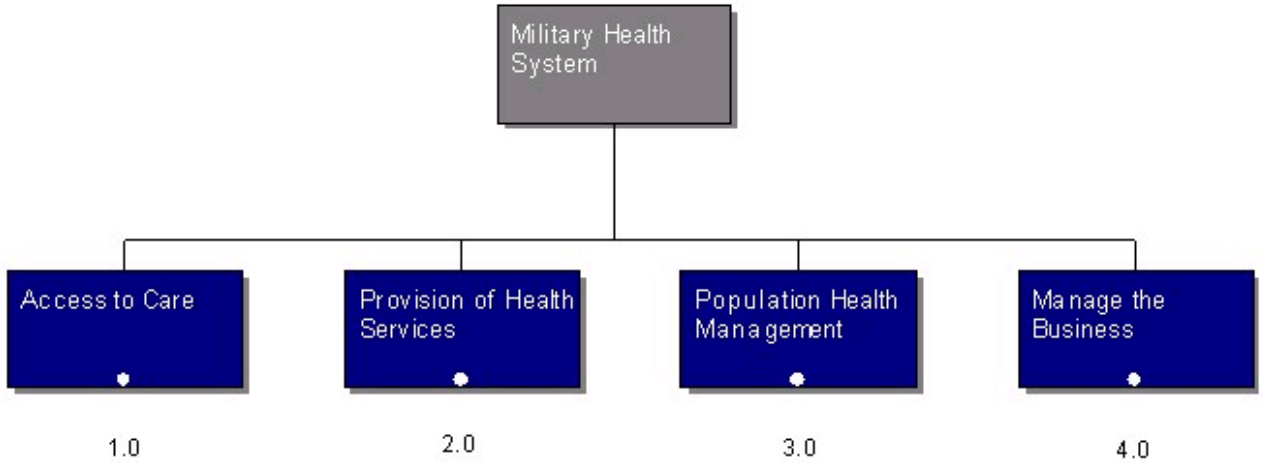
MHS ACTIVITY MODEL OV-5 - CORE PROCESSES



Navigation instructions:

Click on the top half of the box for details about the Business Process.

Click on the bottom half (or dot) for explosion into its lower-level diagram.

In general, click on any diagram symbol or text label for its detailed description.

Return to OV Home Page | Return to Enterprise Architecture Home Page

This page was last updated on 09/30/2002 14:30:13

Done My Computer

Access to Care OV-5 - Microsoft Internet Explorer provided by HA/TMA

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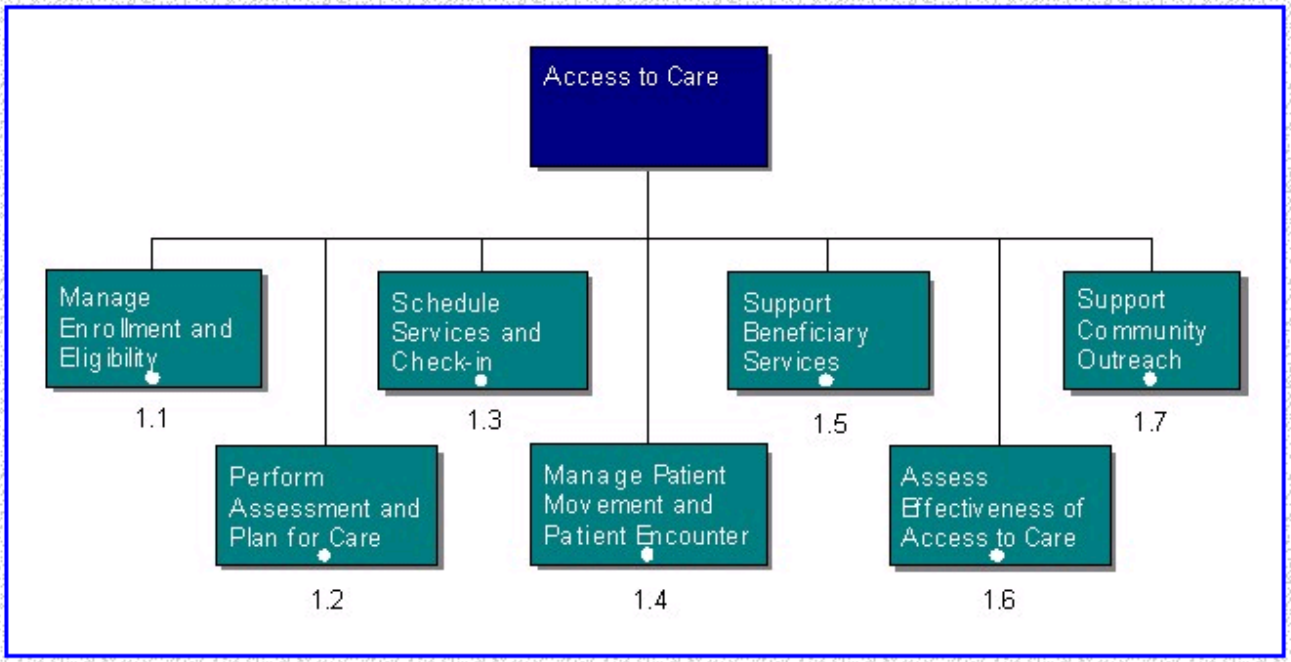
ACCESS TO CARE OV-5



Description

OV-5 Activity Model Symbols

Access to Care OV-5 details the Business Process: Access to Care

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Schedule Services / Check-in - Microsoft Internet Explorer provided by HA/TMA
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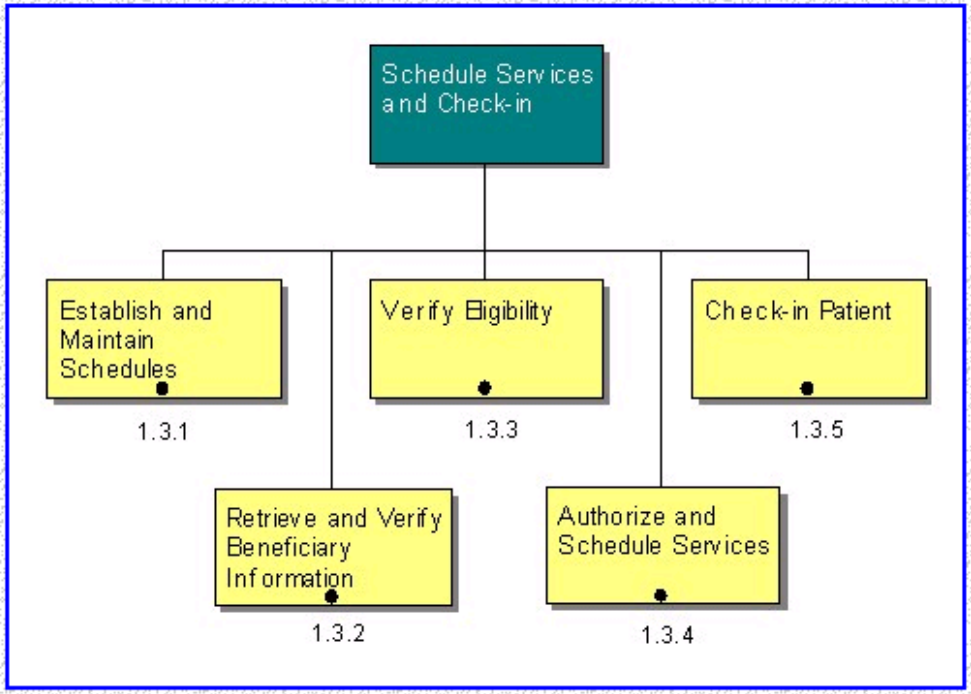
MHS Enterprise Architecture 2.0

SCHEDULE SERVICES / CHECK-IN



Schedule Services / Check-in details the Business Process: Schedule Services and Check-in

Appears on

- Access to Care OV-5
- Access to Care OV-2

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Check-in Patient OV-2 - Microsoft Internet Explorer provided by HA/TMA
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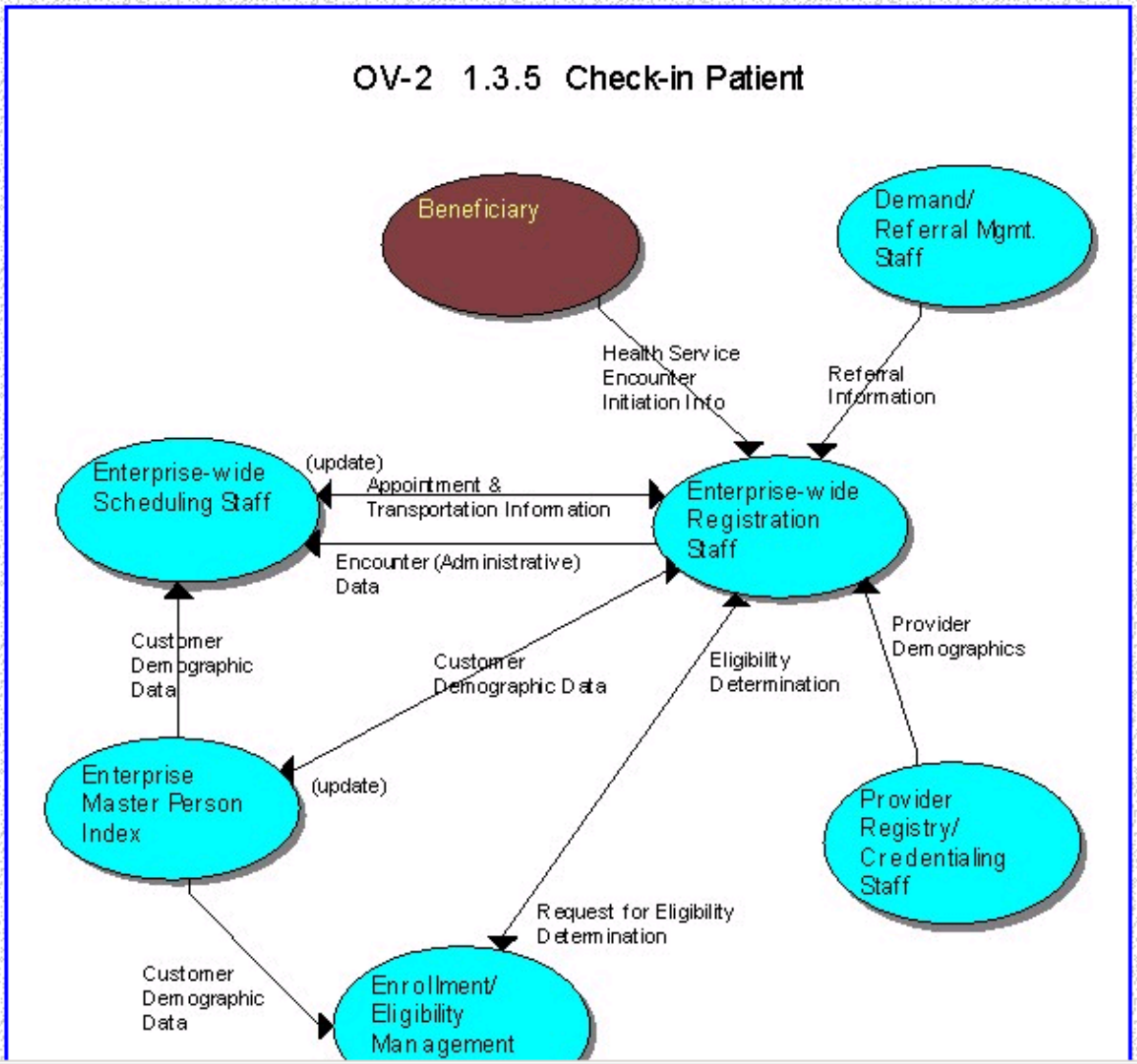
CHECK-IN PATIENT OV-2



SV-1 - Microsoft Internet Explorer provided by HA/TMA

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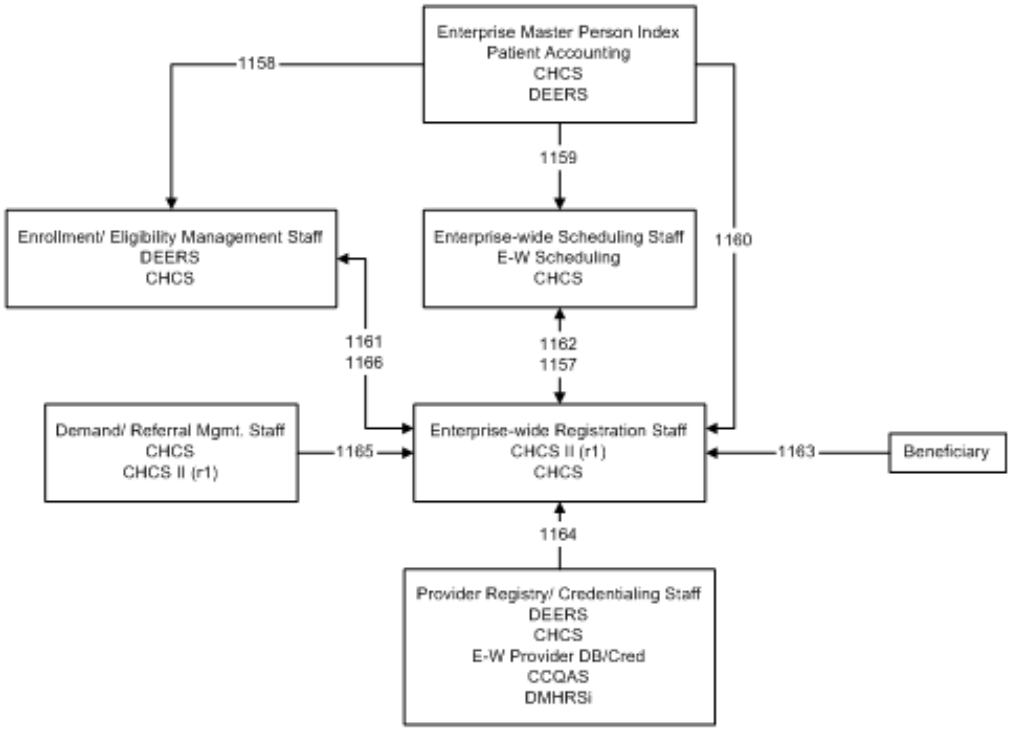
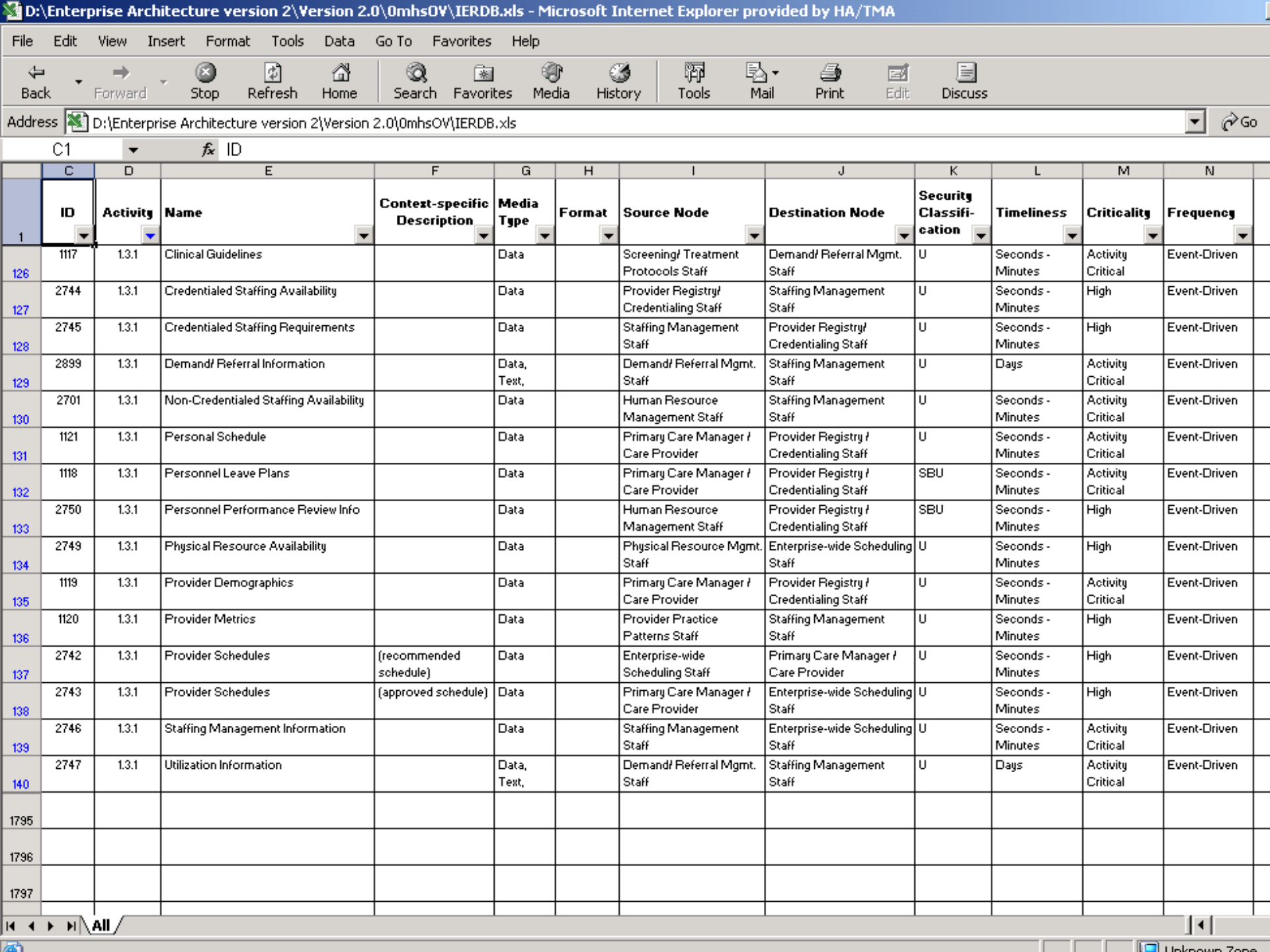
Go to OV-2

SV-1 System Interface Description
Activity 1.3.5
Check-in Patient

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C1
ID

	C	D	E	F	G	H	I	J	K	L	M	N
1	ID	Activity	Name	Context-specific Description	Media Type	Format	Source Node	Destination Node	Security Classification	Timeliness	Criticality	Frequency
126	1117	1.3.1	Clinical Guidelines		Data		Screening/ Treatment Protocols Staff	Demand/ Referral Mgmt. Staff	U	Seconds - Minutes	Activity Critical	Event-Driven
127	2744	1.3.1	Credentialed Staffing Availability		Data		Provider Registry/ Credentialing Staff	Staffing Management Staff	U	Seconds - Minutes	High	Event-Driven
128	2745	1.3.1	Credentialed Staffing Requirements		Data		Staffing Management Staff	Provider Registry/ Credentialing Staff	U	Seconds - Minutes	High	Event-Driven
129	2899	1.3.1	Demand/ Referral Information		Data, Text,		Demand/ Referral Mgmt. Staff	Staffing Management Staff	U	Days	Activity Critical	Event-Driven
130	2701	1.3.1	Non-Credentialed Staffing Availability		Data		Human Resource Management Staff	Staffing Management Staff	U	Seconds - Minutes	Activity Critical	Event-Driven
131	1121	1.3.1	Personal Schedule		Data		Primary Care Manager / Care Provider	Provider Registry / Credentialing Staff	U	Seconds - Minutes	Activity Critical	Event-Driven
132	1118	1.3.1	Personnel Leave Plans		Data		Primary Care Manager / Care Provider	Provider Registry / Credentialing Staff	SBU	Seconds - Minutes	Activity Critical	Event-Driven
133	2750	1.3.1	Personnel Performance Review Info		Data		Human Resource Management Staff	Provider Registry / Credentialing Staff	SBU	Seconds - Minutes	High	Event-Driven
134	2749	1.3.1	Physical Resource Availability		Data		Physical Resource Mgmt. Staff	Enterprise-wide Scheduling Staff	U	Seconds - Minutes	High	Event-Driven
135	1119	1.3.1	Provider Demographics		Data		Primary Care Manager / Care Provider	Provider Registry / Credentialing Staff	U	Seconds - Minutes	Activity Critical	Event-Driven
136	1120	1.3.1	Provider Metrics		Data		Provider Practice Patterns Staff	Staffing Management Staff	U	Seconds - Minutes	High	Event-Driven
137	2742	1.3.1	Provider Schedules	(recommended schedule)	Data		Enterprise-wide Scheduling Staff	Primary Care Manager / Care Provider	U	Seconds - Minutes	High	Event-Driven
138	2743	1.3.1	Provider Schedules	(approved schedule)	Data		Primary Care Manager / Care Provider	Enterprise-wide Scheduling Staff	U	Seconds - Minutes	High	Event-Driven
139	2746	1.3.1	Staffing Management Information		Data		Staffing Management Staff	Enterprise-wide Scheduling Staff	U	Seconds - Minutes	Activity Critical	Event-Driven
140	2747	1.3.1	Utilization Information		Data, Text,		Demand/ Referral Mgmt. Staff	Staffing Management Staff	U	Days	Activity Critical	Event-Driven
1795												
1796												
1797												